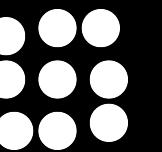


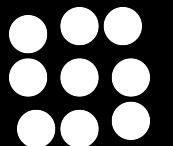
A Talk in Kudi



WA

Is it really next generation?

WebAssembly





Tochukwu Nkemdilim

Backend @ Day, Rust @ Night

What really is WASM?



WebAssembly (abbreviated Wasm) is a binary instruction format for a stack-based virtual machine.

Wasm is designed as a portable target for compilation of high-level languages like C/C++/Rust, enabling deployment on the web for client and server applications.

Let's go back a few steps in time

1

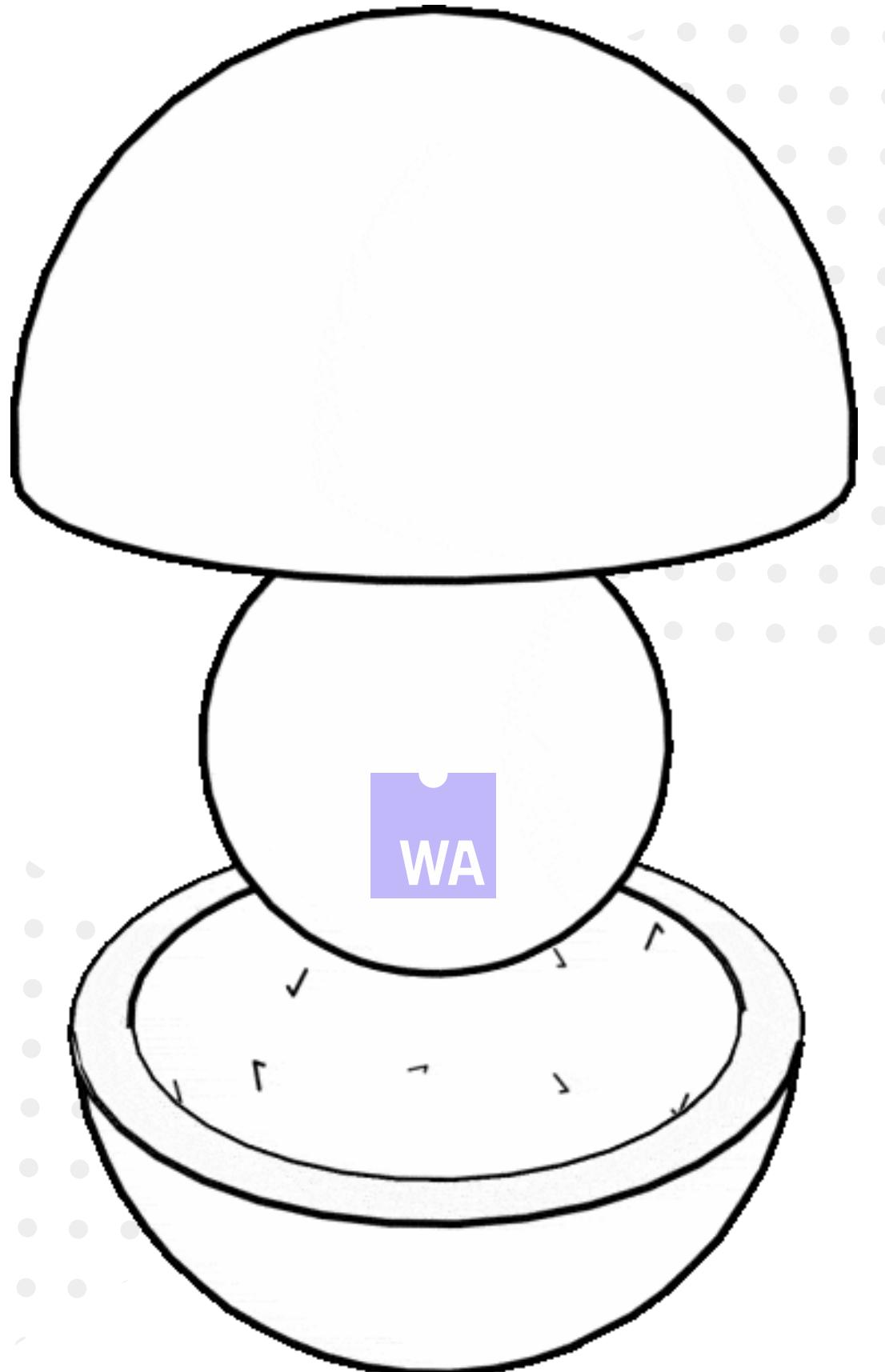
ASM.js

2

Emscripten

3

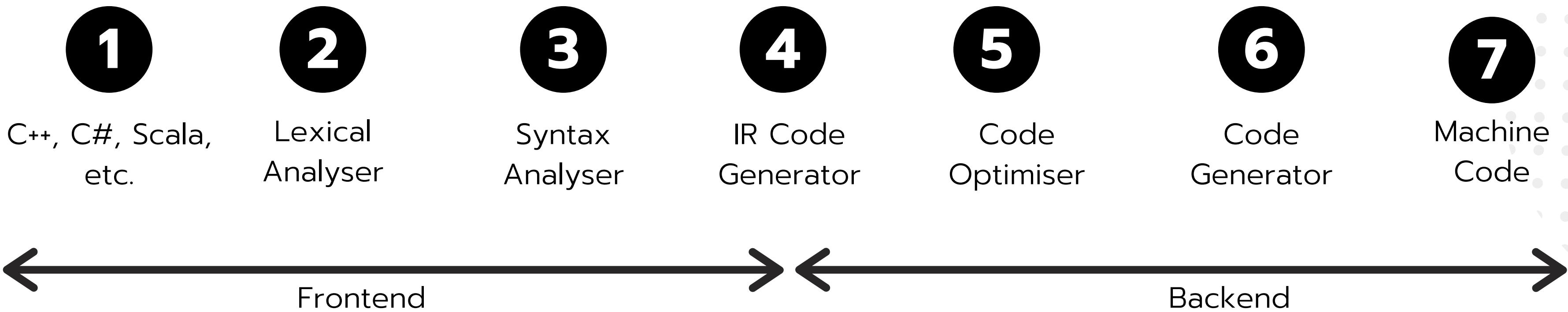
Assembly



Is simply a compile target.

<https://mbebenita.github.io/WasmExplorer>

Let's understand how compilers are built



Why can't we just run JS on the web

v8, Chakra, SpiderMonkey, Rhino

We'll need to understand how JS compilation works

1

Startup

(Parsing, Execution, Warm Up)

2

Profiler

(Analytics Gathering & hot paths)

3

Ignition

(Interpreter)

4

TurboFan

(Runtime Optimizing Compiler)

Understanding WASM Compilation

1

Python, Typescript,
C++, Go, Rust, C#, Scala

2

Intermediate
Representation
(IR)

3

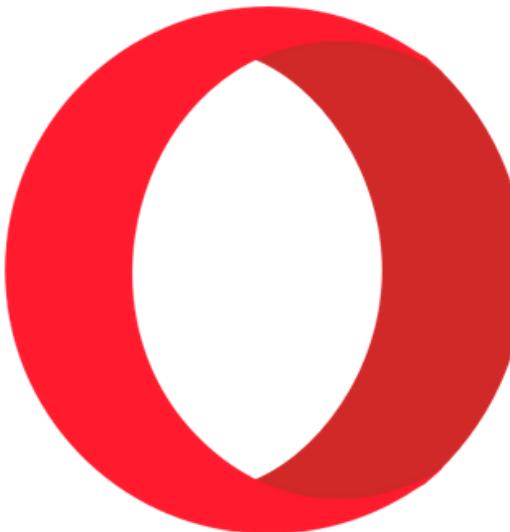
WASM

4

x86_64-apple-darwin,
aarch64-apple-ios,
aarch64-unknown-linux-
gnu, etc.

Supported Browsers

Streamed Compilation



Hello Backend,
we've been talking
Browsers

WASM + WASI = ❤



The WebAssembly System Interface

(Portability & Security)

<https://wasi.dev>



Solomon Hykes
@solomonstre

If WASM+WASI existed in 2008, we wouldn't have needed to created Docker. That's how important it is. Webassembly on the server is the future of computing. A standardized system interface was the missing link. Let's hope WASI is up to the task!



Lin Clark @linclark · Mar 27, 2019

WebAssembly running outside the web has a huge future. And that future gets one giant leap closer today with...

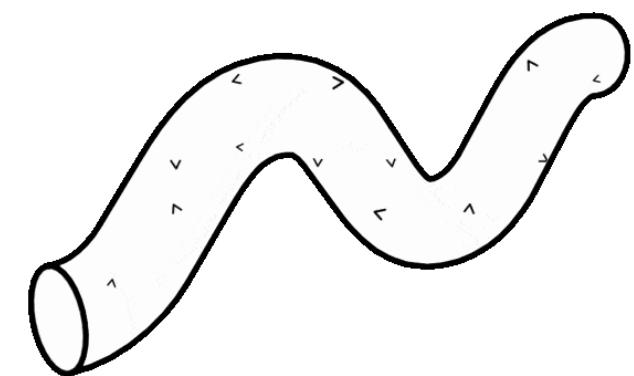
📢 Announcing WASI: A system interface for running WebAssembly outside the web (and inside it too)

hacks.mozilla.org/2019/03/standa...

[Show this thread](#)

9:39 PM · Mar 27, 2019 · Twitter Web Client

750 Retweets 1.8K Likes



Tweet Source

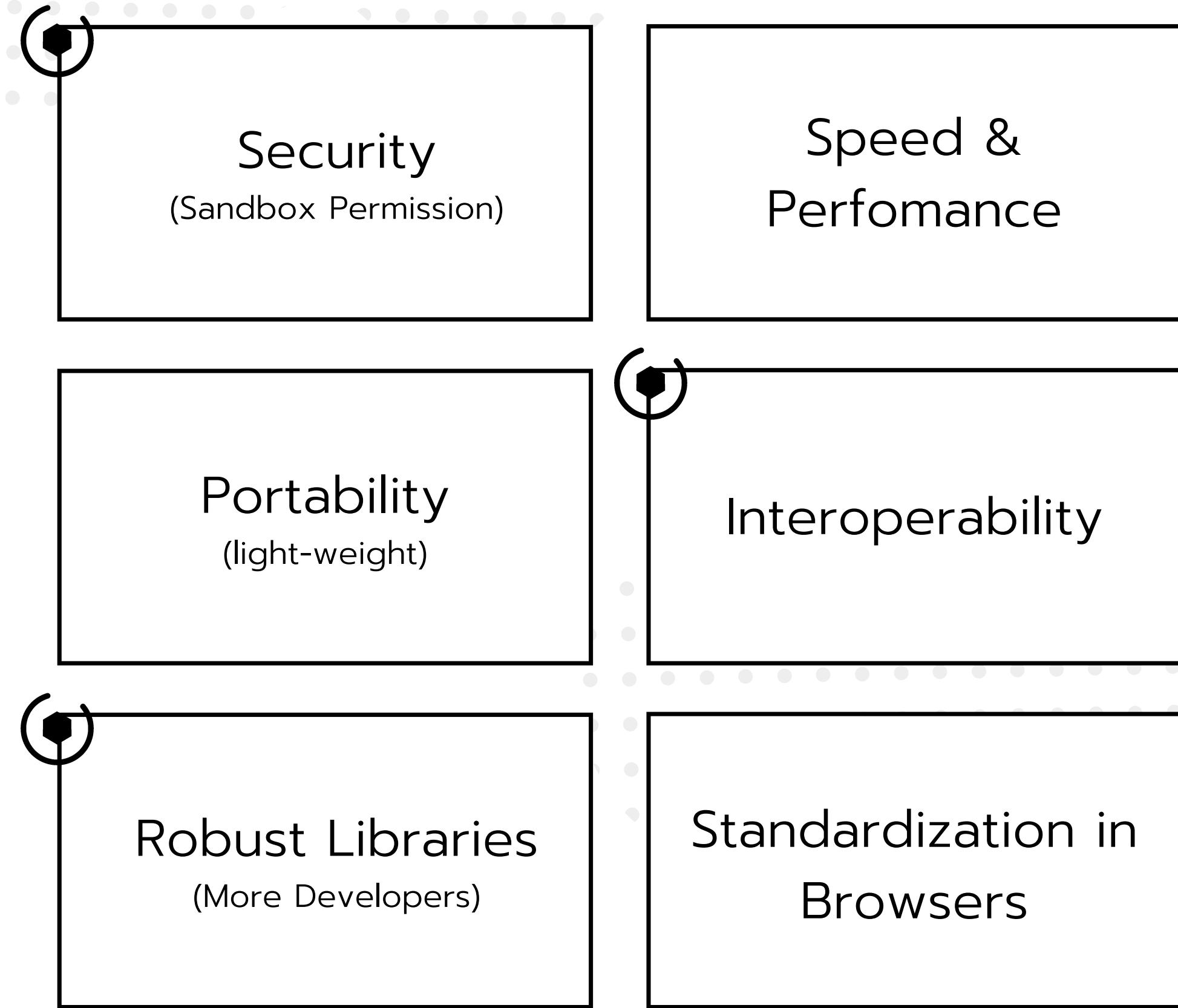
<https://twitter.com/solomonstre/status/111004913222324225>

What this means for Serverless?

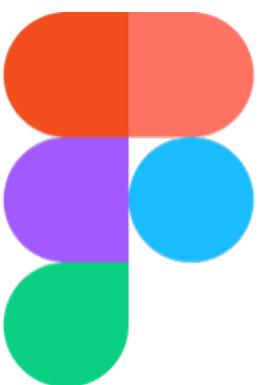
Benefits

Talk is cheap.

Where's the money?



Top guns in the industry



WASM Runtime

Only 2 people know that:
"All Code Is Garbage"

TechLead & The Runtime



Available Runtimes

<https://github.com/appcypher/awesome-wasm-runtimes>

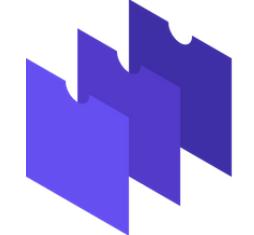


Wasmo

(LLVM Backend)

wasmtime

(LLVM Backend)



wasmer

(LLVM, Cranelift Backend)

INNATIVE

(LLVM Backend)

How can I use it in my regular day life?

1

Building for a large audience of developers

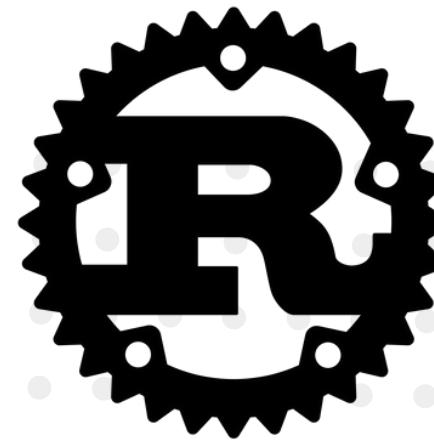
2

Implementing heavy lifting task (esp. browser)

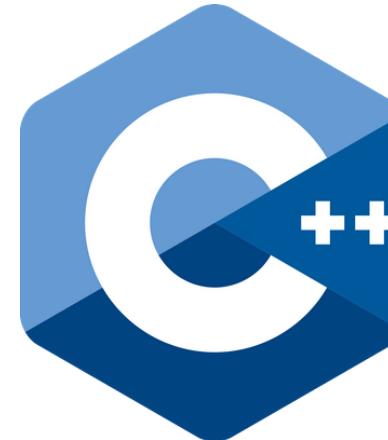
3

Existing library that doesn't exist in our stack

Getting Started



wasm-pack
wasm-bindgen
wasmtime



asm.js
Emscripten



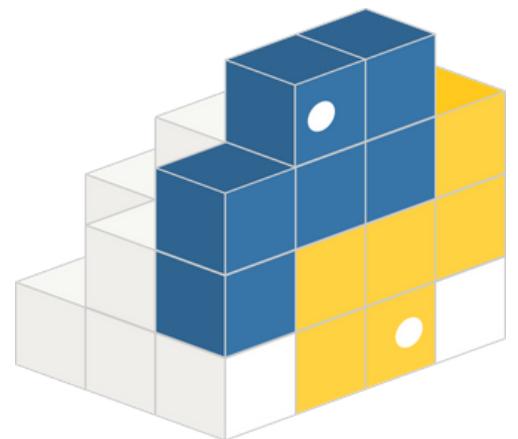
AssemblyScript



tinygo

Package Registries

What sets it apart



Publishing Package



npm init

npm login

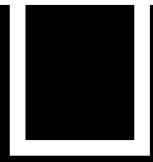
npm publish



wasm init

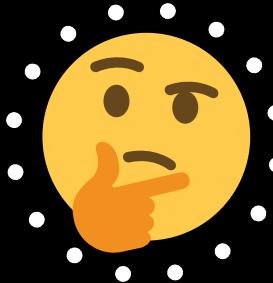
wasm login

wasm publish



wasm-pack pack

wasm-pack publish



Should I stop writing my current language?

No, WASM is not a replacement but a collaborator.

Demo

<https://webassembly.org/docs/future-features>

1

Rust -> WASM
(with JS)

2

Wasmtime

3

WASM from JS

4

Python & WASM
(from Rust)

Current Proposals

<https://webassembly.org/docs/future-features>

1

Threads

2

Fixed-width SIMD

3

Exception Handling

4

Garbage Collection

5

Bulk
memory operations

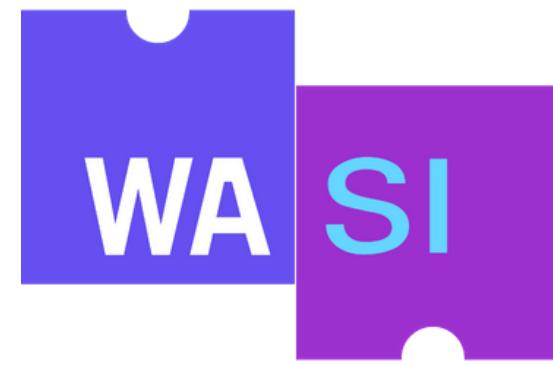
6

JavaScript BigInt to
WebAssembly i64 integration

Contribute



[https://webassembly.org/
community/feedback](https://webassembly.org/community/feedback)



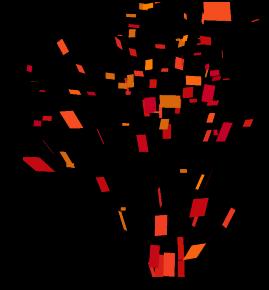
<https://wasi.dev>



<https://github.com/wasmerio/wasmer>

Learn More

- <https://webassembly.org>
- <https://blog.scottlogic.com/2019/12/24/webassembly-2019.html>
- <https://hashrocket.com/blog/posts/webassembly-the-next-language-of-the-web>
- <https://developer.mozilla.org/en-US/docs/WebAssembly>
- <https://hacks.mozilla.org/category/webassembly>
- <https://webassembly.org/community/feedback>
- <https://www.youtube.com/watch?v=fh9WXPu0hw8>
- <https://www.youtube.com/watch?v=A9SydP1CcZU>
- <https://www.youtube.com/watch?v=TF-tXDRAEmg>
- <https://www.youtube.com/watch?v=njt-Qzw0mVY>
- <https://www.youtube.com/watch?v=bac0dGQbUto>
- https://www.youtube.com/watch?v=HktWin_LPf4
- <https://www.youtube.com/watch?v=lLzFJenzBng>



Reach Out

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 <https://rust-telescope.live>